ABSTRACT

In general, one embodiment of the invention relates to a method for detecting data bits and estimating the channel reliability of each carrier. The detection method comprises (i) computing a complex phase difference between a current symbol and a previous symbol, (ii) separating a real value component (R) from a corresponding imaginary value component (I) forming the complex phase difference, (iii) determining at least one boundary constraint line of a complex phase map for a selected demodulation scheme, and computing an arithmetic combination of the real value component and the corresponding imaginary value component to detect whether a series of bits falls within a selected region of the complex phase map defined by the at least one boundary constraint line. Over N symbols propagating over a carrier, including the current symbol and the previous symbol, the channel estimation counts a number of symbols (less than N but greater than a threshold) that fall within an estimated area of the complex phase map. The estimated area is bound by boundary constraint lines based on a parameterized real value component.